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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/670,704

09/25/2003

Lyle E. Grosbach

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IBM CORPORATION

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EXAMINER

JEAN GILLES, JUDE

ART UNIT

PAPER NUMBER

2143

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/670,704	<b>Applicant(s)</b> GROSBACH ET AL.	
	<b>Examiner</b> JUDE J. JEAN GILLES	<b>Art Unit</b> 2143	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 25 September 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,4,5,8-11,13,14,17,18,21 and 22 is/are rejected.
- 7) ☒ Claim(s) 3,6,7,12,15,16,19 and 20 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### DETAILED ACTION

This action is responsive to communication filed on 09/25/2003.

#### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claims 1-2, 4-5, 8-11, 13-14, 17-18, and 21-22** are rejected under 35

U.S.C. 103(a) as being unpatentable over Laubach et al (hereinafter Laubach) U.S.

Patent No. 6917614 B1 in view of Tilander et al (hereinafter Tilander), U.S. Pub. No. 20050027852 A1.

1. A method of scheduling connections for a network processor (fig. 10) comprising:

in a cache memory, scheduling a plurality of connections to be serviced based on quality of service parameters stored in a control structure corresponding to each connection (*col. 21, lines 4-20; note how the cell queue memory 910 schedules the cell connections based of the QoS information; note that the queue mapping table represents the cache memory spelled out in the claim*); and

during a scheduling opportunity:

identifying one or more of the plurality of connections in the cache memory to be serviced (*col. 39, lines 27-37;; see that the queue identifier number helps in the process of identifying connections to be serviced in the queue*);

selecting one of the connections identified to be serviced; servicing the selected connection (*see abstract and the role of predictive scheduling*);

accessing one or more portions of the control structure, including the quality of service parameters, in the cache memory, the quality of service parameters corresponding to the selected connection (*col. 9, lines 8-28*);

calculating a next service time when the selected connection is to be serviced, the next service time being based on the quality of service parameters; and

determining whether to schedule the selected connection to be serviced in one of the cache memory and a calendar based on the next service time (*col. 41, lines 47-67, continue in col. 48, lines 1-23*).

On area of deficiency noted from the Patent of Laubach is that the reference does not specifically show a cache memory doing the actual scheduling of connections to be serviced based on quality of service parameters as spelled out above.

Nevertheless, this feature is well known and would have been an obvious modification to the system taught by Laubach as evidenced by Tilander,

In an analogous art, Tilander teaches a method in which “*resource selector 352 updates connection statistics stored by connection cache 370. The connection statistics are updated to include information about the required call resource. The connection statistics include preferably information such as the quality of service*

*parameters for AAL2 connections. Necessarily, also the connection statistics specify all the needed information to determine whether the connection is of correct type, that is, what units it is connecting. For example, for an AAL2 connection there may be recorded the A2SP from which it starts and the TPG where it ends. Preferably, only those quality of service parameters are stored in statistics that are necessary for the matching of required AAL2 connections to suitable existing connections that have been cached to connection cache 370. One such quality of service parameter to be explicitly mentioned is the bitrate i.e. bandwidth of the AAL2 connection..." (see Tilander, par. 0042).*

Accordingly, a person of ordinary skill in the art would have readily recognized the desirability and advantages of modifying the system of Laubach to employ the feature of Tilander for the purpose of increasing performance thereby avoiding the time consuming task of creating connections from scratch (see Tilander par. 0022). By this rationale, claim 1 is rejected.

Regarding **claims 2, 4-5, 8-11, 13-14, 17-18, and 21-22**, the combination Laubach-Tilander teaches:

2. The method of claim 1 further comprising, during each subsequent scheduling opportunity, servicing a remaining one of the one or more connections identified to be serviced in the cache memory, until all of the one or more identified connections have been serviced (see Tilander, par. 0042).

4. The method of claim 1 wherein scheduling the plurality of connections to be serviced based on quality of service parameters stored in the control structure corresponding to each connection includes storing one or more portions of the control structure corresponding to each of the plurality of connections in a cache memory entry (see Tilander, par. 0022; 0042).

5. The method of claim 1 wherein identifying one or more of the plurality of connections in the cache memory to be serviced includes employing a key to identify one or more of the plurality of connections in the cache memory that include a service time that matches the key, the service time being based on the quality of service parameters (see Laubach; fig. 14 and 15 encryption key table; Tilander, par. 0022; 0042).

8. The method of claim 1 wherein accessing one or more portions of the control structure in the cache memory includes at least one of reading from and writing to an on-chip memory (see Tilander, par. 0022; 0040; 0042).

9. The method of claim 1 wherein calculating the next service time when the selected connection is to be serviced includes calculating how many scheduling opportunities to wait before servicing the selected connection (see Laubach; *col. 21, lines 4-200*).

10. An apparatus for scheduling connections for a network processor (see Laubach; fig.

10) comprising: an external memory; and scheduler logic, having a cache memory and a calendar, coupled to the external memory (see Laubach; fig. 10, items 803, 1020, 1018 etc.), and adapted to: in the cache memory, schedule a plurality of connections to be serviced based on quality of service parameters stored in a control structure corresponding to each connection (see Laubach; *col. 39, lines 27-37; col. 21, lines 4-20*); and during a scheduling opportunity: identify one or more of the plurality of connections in the cache memory to be serviced (see Laubach; *col. 39, lines 27-37; col. 21, lines 4-20*); select one of the connections identified to be serviced; service the selected connection; access one or more portions of the control structure, including the quality of service parameters, in the cache memory, the quality of service parameters corresponding to the selected connection; calculate a next service time when the selected connection is to be serviced, the next service time being based on the quality of service parameters; and determine whether to schedule the selected connection to be serviced in one of the cache memory and the calendar based on the next service time (*col. 9, lines 8-28; col. 41, lines 47-67, continue in col. 48, lines 1-23*) see also for the description of the cache memory scheduling connections (see Tilander, par. 0022; 0040; 0042).

11. The apparatus of claim 10 wherein the scheduler logic is further adapted to, during each subsequent scheduling opportunity, service a remaining one of the one or more connections identified to be serviced in the cache memory, until all of the one or more identified connections have been serviced (see Tilander, par. 0022; 0040; 0042).

13. The apparatus of claim 10 wherein the scheduler logic is further adapted to store the one or more portions of the control structure corresponding to each of the plurality of connections in a cache memory entry (see Tilander, par. 0022; 0040; 0042).

14. The apparatus of claim 10 wherein the scheduler logic is further adapted to employ a key to identify one or more of the plurality of connections in the cache memory that include a service time that matches the key, the service time being based on the quality of service parameters (see Laubach; fig. 14 and 15 encryption key table; Tilander, par. 0022; 0042).

17. The apparatus of claim 10 wherein the scheduler logic is further adapted to at least one of read from and write to an on-chip memory (see Laubach; fig. 14 and 15 encryption key table; Tilander, par. 0022; 0042).

18. The apparatus of claim 10 wherein the scheduler logic is further adapted to calculate how many scheduling opportunities to wait before servicing the selected connection (see Laubach; fig. 14 and 15 encryption key table; Tilander, par. 0022; 0042).



19. The apparatus of claim 10 wherein the scheduler logic comprises: reload control logic coupled to the cache memory, reload calendar, external memory, and evict control logic (see Laubach; fig. 10, items 803, 1020, 1018 etc.), and adapted to: schedule one or more portions of a control structure corresponding to a connection to be serviced in the reload calendar; retrieve one or more portions of the control structure corresponding to the connection to be serviced from the reload calendar; and schedule the one or more portions of the retrieved control structure corresponding to a connection to be serviced in the cache memory (see Laubach; *col. 39, lines 27-37; col. 21, lines 4-20*); enqueue control logic coupled to the cache memory, and the external memory, and adapted to schedule one or more portions of the control structure corresponding to the connection to be serviced in the cache memory; dequeue control logic coupled to the cache memory, and adapted to: identify one or more of a plurality of connections in the cache memory to be serviced; select one of the connections identified to be serviced; and service the selected connection; and evict control logic coupled to the cache memory and the external memory, and adapted to: receive one or more portions of the control structure corresponding to the connection that was scheduled in the cache memory; and determine whether to output the one or more portions of the control structure to one of the external memory and the reload control logic (*col. 9, lines 8-28; col. 41, lines 47-67, continue in col. 48, lines 1-23*) see also for the description of the cache memory scheduling connections (see Tilander, par. 0022; 0040; 0042).

20. The apparatus of claim 19 wherein the cache memory includes: a time stamp

contents addressable memory; a flow id contents addressable memory; and a flow control block memory; wherein the time stamp contents addressable memory, flow id contents addressable memory and the flow control block memory are such adapted to store one or more portions of each cache memory entry connections (see Laubach; *col. 39, lines 27-37; col. 21, lines 4-20*).

21. A method for scheduling connections (see Laubach; fig. 10, items 803, 1020, 1018 etc,) comprising: during a scheduling opportunity: identifying one or more of a plurality of connections scheduled to be serviced in a cache memory based on one or more portions of a control structure corresponding to each of the plurality of connections; servicing one of the identified connections (see Laubach; *col. 39, lines 27-37; col. 21, lines 4-20*); and scheduling the serviced connection to be serviced again in one of the cache memory and a calendar based on the one or more portions of the control structure corresponding to the serviced connection (*col. 9, lines 8-28; col. 41, lines 47-67, continue in col. 48, lines 1-23*) see also for the description of the cache memory scheduling connections (see Tilander, par. 0022; 0040; 0042).

22. The method of clam 21 further comprising, during each subsequent scheduling opportunity, servicing a remaining one of the identified connections until all of the identified connections have been serviced connections (see Laubach; *col. 39, lines 27-37; col. 21, lines 4-20*).

***Allowable Subject Matter***

3. Claims 3, 6-7, 12, 15-16, and 19-20 would be allowable if rewritten in independent form or amended to include all of the limitations of the base claim and any intervening claims.

***Conclusion***

4. ***This action is made Non-Final.*** Any inquiry concerning this communication or earlier communications from examiner should be directed to Jude Jean-Gilles whose telephone number is (571) 272-3914. The examiner can normally be reached on Monday-Thursday and every other Friday from 8:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn, can be reached on (571) 272-1915. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-3301.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-0800.

/Jude J Jean-Gilles/

Primary Examiner, Art Unit 2143

JJG

April 28, 2008

